EUROPEAN COMMISSION
Information Society and Media Directorate General

Lisbon Strategy and Policies for the Information Society
Lisbon Strategy and i2010

Use of Computers and the Internet in Schools in Europe 2006

Country Brief: Sweden

6 / 2006

Key findings

All Swedish schools use computers for teaching and have internet access. Almost all of them use the internet via a broadband connection (89%). With this figure Sweden ranks at number 3 of the 27 countries participating in the survey.

There is little variation between school types: while 86% of primary schools have a broadband internet connection, the penetration is highest among lower and upper secondary schools, with 95%.

A very high 86% of the Swedish schools using computers for teaching use them in classrooms, with the highest percentage being achieved in primary schools (89%).

In a very high more than 90% the use of ICT has become an integral part of teaching most subjects with hardly any variation across school types. Only schools in the United Kingdom achieve a higher figure.

An extraordinarily high 91% of Swedish classroom teachers had used computers in class in the 12 months prior to the survey, with little variation across school types and between urban and rural areas. Only Denmark and the United Kingdom show even better performances.

Comparable to Finland, for instance, I CT use by teachers in class in Sweden is not the most frequent and intensive in Europe. A majority (54%) of teachers using computers use them in less than 10% of all lessons. Only 9% state that they use computers in more than half of their lessons.

The older teachers (indicator used here: years of teaching experience) are slightly more frequent users of ICT in class.

Only 11% of teachers in Sweden do not use computers in class. When asked for the most important barrier, 43% state a lack of computers in their schools as the most important barrier. In total, "lack of equipment in school" is expressed by a very low only 5% of all Swedish teachers (11% non-users multiplied with 43% of teachers agreeing to this item).

More teachers than on average in Europe see the advantages and benefits of using ICT in class.

A large majority of Swedish teachers are satisfied with the technical access means at their schools

In terms of content a majority states problems with respect to finding adequate learning materials (62%) and argue that existing material are of poor quality (54%). In no other European country are such high figures reached. Further research is needed to identify the underlying reasons for this phenomenon.

However, and what is striking, almost three quarters of the teachers argue that the teachers in school have insufficient ICT skills. This comes as a surprise since with this very high figure on "lack of ICT competence" Sweden finds itself at the tail end in Europe. One can probably only assume that Swedish teachers seem to be very critical of their colleagues and themselves in this respect and downplay their ICT skills and capabilities. Again, further research may help to shed some light on this issue as well.

Almost 50% argue that using computers in class does not have significant learning benefits for pupils, a statement made particularly by teachers in primary schools. The question remains as to what has driven the Swedish teachers to this statement, whether it is their belief or whether they are more critical than their colleagues in other countries.

With only 28% of the teachers having good ICT access, ICT skills and the motivation to use ICT in class, Sweden only ranks 22nd which places the country close to the bottom of European countries. This is a surprising result which contradicts actual facts concerning ICT equipment and internet access in schools and ICT skills etc. of Swedish teachers, which are obviously given at substantial levels. The reasoning here requires further research. It seems not unlikely that the Swedish teachers heavily underestimate their potentials and are much more critical of themselves than teachers in other countries.

ICT access in school is not an issue or problem in Sweden but "motivation" is. A very high 36% of teachers (almost three times higher than the EU25 average) seem to lack motivation to use ICT despite their good ICT access and competence in its use.

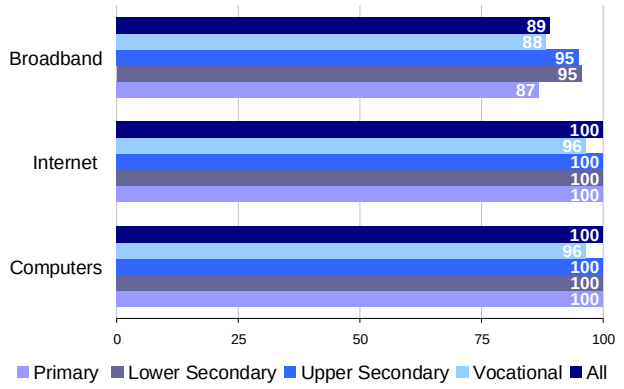
Despite the need for further research to better understand some of the surprising results it appears that actions addressed to an improvement of teacher's motivation for using ICT in class may prove useful and beneficial.

ICT Equipment and Internet in Schools

All Swedish schools use computers for teaching and have internet access. Almost all of them use the internet via a broadband connection (89%). With this figure Sweden ranks at number 3 of the 27 countries participating in the survey.

There is little variation between school types: while 87% of primary schools have a broadband internet connection, the penetration is highest among lower and upper secondary schools, with 95%.

Percentage of Schools Using Computers, Internet Connection, and Broadband Internet Access According to School Type in Sweden 2006



Source: *LearnInd HTS 2006;* ***Base:*** *All schools;* ***Question:*** *Computers: Q6; Internet, Broadband: Q9. See questionnaire for exact wording.*

There is also little variation with regard to broadband access between urban and rural areas: 95% of schools in densely and intermediately populated areas have broadband access compared to 86% of schools in thinly populated areas.

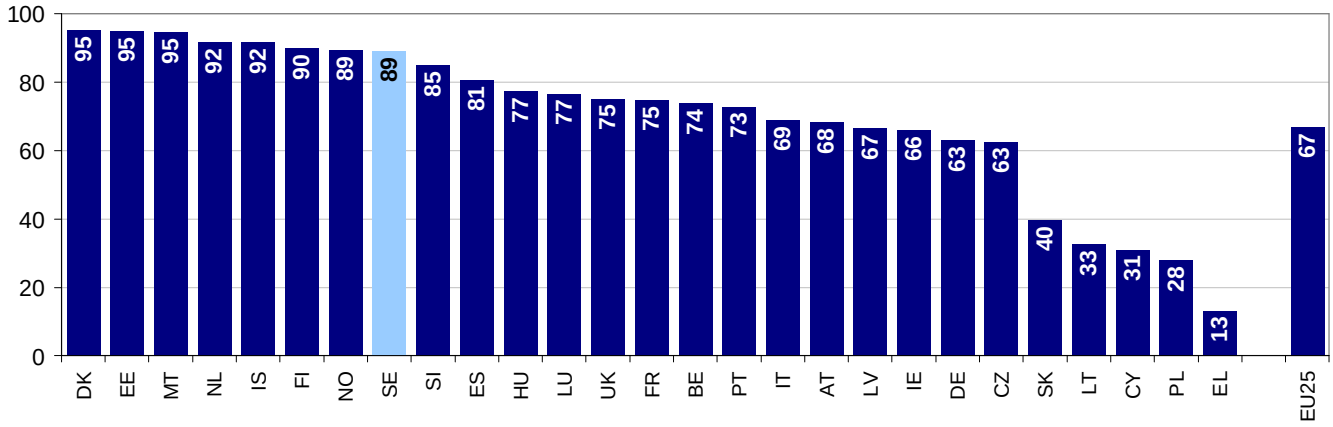
Swedish schools make very good use of ICT. 84% of schools have a website, 96% offer e-mail to teachers, and 70% do so to pupils.

A very high 86% of the Swedish schools using computers for teaching use them in classrooms, with the highest percentage being achieved in primary schools (89%).

Computers in the school library are offered as additional places for internet access mainly in upper secondary schools (51%) and vocational schools (40%).

Those schools with a broadband connection to the internet are much more likely to have a more sophisticated ICT infrastructure including a school website, the use of a LAN or the availability of an intranet.

Percentage of Schools with Broadband Internet Access in Europe 2006



Source: *LearnInd HTS 2006;* ***Base:*** *All schools;* ***Question:*** *Q9. See questionnaire for exact wording.*

ICT equipment in Swedish schools 2006

	Total SE	Total EU25	Educational Level (SE)				Type of locality (SE)		Internet Access (SE)	
			Primary	Lower secondary	Upper secondary	Vocational	Densely populated and intermediate	Thinly populated	Narrow-band	Broadband
Computers per 100 pupils [a]	17.4	11.3	14.6	*13.2**	29.2	17.2	16.4	18.0	*21.5**	17.1
... of which internet connected	16.5	9.9	13.8	*12.7**	27.5	17.0	15.7	17.0	*20.6**	16.2
Percentage of schools having...										
Computers for teaching [b]	99.9	98.7	100.0	*100.0**	100.0	96.4	99.8	100.0	*100.0**	100.0
Internet access [c]	99.9	96.2	100.0	*100.0**	100.0	96.4	99.8	100.0	*100.0**	100.0
Broadband internet access [d]	89.0	66.9	86.8	*95.4**	94.9	88.2	95.5	86.2	*0.0**	100.0
A website [e]	83.8	63.0	80.2	*96.3**	92.4	90.9	79.6	85.6	*79.3**	84.4
An e-mail address for the majority of teachers [f]	95.9	65.2	95.3	*97.6**	97.9	85.9	95.4	96.1	*91.9**	96.4
An e-mail address for the majority of pupils [g]	69.6	23.5	65.5	*71.7**	80.5	65.0	66.0	71.2	*50.2**	72.1
A LAN [h]	69.0	55.2	65.8	*75.8**	85.7	70.8	80.9	63.9	*65.4**	69.5
An intranet [i]	68.8	40.8	68.9	*62.8**	68.9	55.3	61.5	71.9	*74.9**	68.1
An external support or maintenance contract [j]	59.1	47.1	58.7	*62.2**	58.7	58.7	66.6	55.8	*60.8**	58.9
Percentage of schools using computers for education in...										
Computer labs [k]	47.8	80.5	39.2	*69.5**	67.0	79.4	61.4	42.0	*22.3**	50.9
Classrooms [l]	85.5	61.4	89.2	*84.5**	76.3	73.3	80.2	87.8	*77.7**	86.5
School library [m]	23.7	33.4	21.1	*20.2**	50.8	39.7	17.3	26.4	*22.1**	23.9
Other locations accessible for pupils [n]	46.6	27.0	47.7	*35.5**	60.0	52.5	30.4	53.1	*44.3**	46.9

Source: *LearnInd HTS 2006;* ***Base:*** *a: all pupils; b-j: all schools, k-n: schools using computers for educational purposes for pupils (cf. index b);* ***Question:*** *a: Q4, Q6, Q7; b: Q6; c: Q9; d: Q9; e-j: Q12; k-n: Q8. See questionnaire for exact wording.* ***Notes:*** *"xx.x*": based on at least 10 and less than 50 cases.*

Use of computers in class in Sweden 2006

Assessments of the head teacher		Total SE	Total EU25	Educational Level (SE)				Type of locality (SE)		Internet Access (SE)	
				Primary	Lower secondary	Upper secondary	Vocational	Densely populated and intermediate	Thinly populated	Narrow-band	Broadband
Computer sciences taught as separate subject	Agree	54.4	54.7	53.4	*42.4**	97.1	86.1	50.2	56.2	*64.5**	53.2
	Disagree	44.6	43.7	45.4	*54.9**	2.9	13.9	46.7	43.8	*35.5**	45.8
	Don't know	0.9	1.6	1.2	*2.7**	0.0	0.0	3.1	0.0	*0.0**	1.0
Computers and the internet are											
integrated into teaching of most subjects	Agree	90.9	75.3	90.5	*92.2**	93.8	91.1	93.5	89.7	*82.6**	91.9
	Disagree	8.9	24.1	9.5	*7.8**	4.2	8.9	6.5	9.9	*17.4**	7.9
	Don't know	0.2	0.6	0.0	*0.0**	2.1	0.0	0.0	0.3	*0.0**	0.3
computers and the internet are used for teaching traditional subjects or basic skills	Agree	95.4	75.8	95.2	*89.3**	94.5	64.2	95.9	95.2	*91.2**	95.9
	Disagree	3.2	22.8	3.6	*8.0**	1.6	21.6	0.8	4.2	*8.8**	2.5
	Don't know	1.4	1.4	1.2	*2.7**	3.9	14.2	3.3	0.7	*0.0**	1.6
used for teaching foreign languages	Agree	75.1	56.6	70.3	*89.6**	84.2	74.0	83.1	71.6	*61.8**	76.7
	Disagree	22.0	40.1	26.2	*10.4**	13.6	26.0	12.9	25.9	*38.2**	20.0
	Don't know	2.9	3.3	3.5	*0.0**	2.3	0.0	4.0	2.5	*0.0**	3.3
used for coping with students with special needs/ handicaps	Agree	97.4	71.7	98.1	*97.6**	93.3	79.1	97.6	97.3	*99.4**	97.1
	Disagree	2.6	23.7	1.9	*2.4**	6.7	20.9	2.4	2.7	*0.6**	2.9
	Don't know		4.6	0.0	*0.0**	0.0	0.0	0.0	0.0	*0.0**	0.0

Source: *LearnInd HTS 2006;* ***Base:*** *All schools using computers for educational purposes for pupils;* ***Question:*** *Q13: "To what extent do you agree or disagree with the following statements regarding the educational use of computers and/or the internet in your school?"* ***Notes:*** *"xx.x*": based on at least 10 and less than 50 cases.*

The use of Computers and the Internet in Schools

Computers are used for various purposes and as part of teaching different subjects in schools but also and very widely as a separate subject.

Computer sciences are taught as a separate subject in 54% of Swedish schools, mainly in upper secondary (97%) and vocational schools (86%).

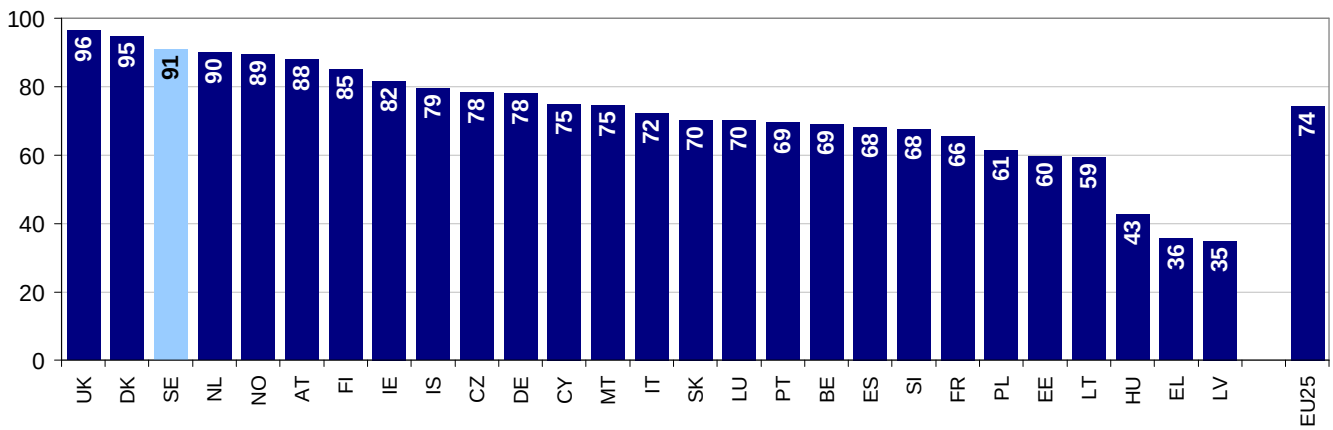
For a very high more than 90% the use of ICT has become an integral part of teaching most subjects with hardly any variation across school types. Only schools in the United Kingdom achieve a higher figure.

An extraordinarily high 91% of Swedish classroom teachers had used computers in class in the 12 months prior to the survey, with little variation across school types and between urban and rural areas. Only Denmark and the United Kingdom show even better performances.

For most teachers, this includes not only using a computer for presentation purposes but also the use of computers by pupils in class. Again, usage figures are very high.

Comparable to Finland, for instance, ICT use by teachers in class in Sweden is not the most frequent and intensive in Europe. A majority (54%) of teachers using computers use them in less than 10% of all lessons. Only 9% state that they use computers in more than half of their lessons. Teachers in upper secondary and vocational schools use computers in class much more frequently than their colleagues in general education with more than 50% using computers in more than a quarter of their lessons. This compares to 24% in lower secondary and 17% in primary schools.

Percentage of teachers who have used computers in class in the last 12 months (2006)



Source: *LearnInd CTS 2006;* ***Base:*** *All teachers;* ***Question:*** *Q7. See questionnaire for exact wording*

Teachers' use of computers in class in Sweden 2006

Percentage of teachers who ...	Total SE	Total EU25	Educational Level (SE)				Type of locality (SE)			Years of teaching experience (SE)			
			Primary	Lower secon-dary	Upper secon-dary	Voca-tional	Densely popu-lated	Inter-mediate	Thinly popu-lated	<5 y	5-9 y	10-19 y	20+ y
...have used computers in class[1]	90.9	74.3	90.0	91.7	94.6	87.7	87.7	93.6	91.1	87.0	85.9	95.5	93.1
...use a computer in class to present or demonstrate	74.1	63.4	73.4	70.3	88.0	80.2	75.5	77.6	73.1	69.5	69.2	78.5	76.6
...have pupils use a computer in class	82.4	66.3	80.4	84.1	92.5	80.5	71.0	88.4	84.0	81.3	72.9	85.0	86.7

Source: *LearnInd CTS 2006;* ***Base:*** *All teachers;* ***Question:*** *Q7 "How have you used computers and/or the internet for work in the last 12 months?"*

Swedish teachers using computers do not restrict themselves to a particular source of information but use a multitude of different material from a variety of sources for teaching purposes, which in most categories is above the European average. They are also very active (85%) in searching for material themselves in the internet. This shows a very proactive behaviour.

The older teachers (indicator used here: years of teaching experience) are slightly more frequent users of ICT in class with 26% of the younger teachers with less than five years teaching experience using it in more than 25% of their lessons compared to 18% of the older ones with more than 20 years of teaching experience.

Only 11% of teachers in Sweden do not use computers in class. When asked for the most important barrier, 43% state a lack of computers in their schools as the most important barrier. This is particularly the case in lower level schools and in rural areas. In the latter, 55% give this as a barrier compared to just 4% in urban areas. Also, and especially in vocational schools, many teachers (63%) argue that their subject does not lend itself to being taught using ICT.

In total, "lack of equipment in school" is expressed by a very low only 5% of all Swedish teachers (11% non-users multiplied with 43% of teachers agreeing to this item).

More teachers in Sweden than on average in Europe see the advantages and benefits of using ICT in class.

Comparison of the situation in 2001 and 2006[2]

In Sweden the percentage of schools using computers for educational purposes had already reached 100% in 2001.

Frequency of computers use in class Sweden 2006

Percentage of all teachers *using computers in class* who ...	Total SE	Total EU25	Educational Level (SE)				Type of locality (SE)			Years of teaching experience (SE)			
			Primary	Lower secon-dary	Upper secon-dary	Voca-tional	Densely popu-lated	Inter-mediate	Thinly popu-lated	<5 y	5-9 y	10-19 y	20+ y
...use computers in 5% and less of all lessons	23.1	18.5	28.0	19.6	11.0	*7.8**	13.4	30.7	23.8	19.3	25.1	23.6	23.5
in 6 to 10% of lessons	31.0	22.5	33.9	32.1	17.1	*21.9**	31.1	34.6	30.2	36.2	30.2	29.9	29.7
in 11 to 24% of lessons	23.3	22.2	21.3	24.6	19.1	*15.4**	26.4	17.4	23.7	18.6	16.1	23.1	29.0
in 25 to 50% of lessons	14.0	20.2	11.2	15.8	20.4	*30.8**	16.8	4.3	15.2	14.9	19.1	17.6	9.0
more than 50% of lessons	8.7	16.5	5.6	7.8	32.3	*24.1**	12.4	12.9	7.1	10.9	9.6	5.9	8.8

Source: *LearnInd CTS 2006;* ***Base:*** *Teachers using computers in class, "don't know" answers excluded;* ***Question:*** *Q9 "For what percentage of time have you used computers and/or the internet in class when teaching your main subject(s) in the past 12 months?"*

Source of educational material used in class in Sweden 2006

Percentage of all teachers *using computers in class*[3] who ...	**Total SE**	**Total EU25**	**Educational Level**				**Type of locality**		
			Primary	**Lower secondary**	**Upper secondary**	**Vocational**	**Densely populated**	**Inter-mediate**	**Thinly populated**
...use material they have searched the internet for	85.3	82.7	85.0	90.5	87.2	*85.2**	87.3	75.2	86.7
...use existing online material from established educational sources	77.2	74.2	76.2	79.9	79.6	*73.6**	80.6	84.7	75.0
...use material that is available on the school's computer network or database	71.9	63.1	71.8	71.4	73.2	*71.6**	75.5	71.8	71.0
...use electronic offline material (such as CD ROMS)	67.4	83.0	67.1	64.5	63.4	*65.1**	61.8	67.6	68.7
...use other learning material when using computers in class	3.5	8.8	3.6	4.0	3.4	*8.2**	1.3	2.7	4.1

Source: *LearnInd CTS 2006;* ***Base:*** *Teachers using computers in class;* ***Question:*** *Q10 "Which of the following types of materials have you used when teaching your main subject(s) with the aid of a computer and/or the internet?"* ***Notes:*** *"xx.x*": based on at least 10 and less than 50 cases.*

Barriers to computer use in class in Sweden 2006

Percentage of all teachers ***not*** *using computers in class*	Total SE	Total EU25	Educational Level				Type of locality		
			Primary	Lower secondary	Upper secondary	Vocational	Densely populated	Inter-mediate	Thinly populated
Lack of computers	*42.8**	48.8	*41.6**	*41.1**	*22.6**	*33.2***	*4.4***	*45.8***	*55.2**
Lack of adequate content/material	*10.7**	20.3	*11.6**	*15.9**	*28.9**	*23.0***	*21.5***	*15.1***	*6.6**
Lack of content in national language	*4.9**	8.6	*6.0**	*13.8**	*0.0**	*0.0***	*21.5***	*0.0***	*0.0**
Lack of adequate skills of teachers	*3.7**	22.5	*4.6**	*0.0**	*0.0**	*0.0***	*0.0***	*0.0***	*5.5**
No or unclear benefits	*13.2**	16.2	*16.4**	*15.9**	*9.9**	*0.0***	*21.5***	*0.0***	*12.3**
Lack of interest of teachers	*4.6**	8.9	*4.8**	*0.0**	*9.9**	*0.0***	*0.0***	*0.0***	*6.8**
Subject does not lend itself to being taught via computers	*36.8**	24.4	*35.1**	*26.5**	*32.4**	*63.2***	*50.0***	*46.4***	*31.1**
Other	*17.1**	21.3	*19.8**	*14.4**	*15.4**	*13.8***	*24.2***	*0.0***	*17.1**

Source: *LearnInd CTS 2006;* ***Base:*** *all teachers not using computers in class;* ***Question:*** *Q12: "Why do you not use computers and/or the internet when teaching in class?"* ***Notes:*** *"xx.x*": based on at least 10 and less than 50 cases; "xx.x** " based on less than 10 cases.*

While in 2001 one hundred pupils had to share 15 computers the figure rose to 17 by 2006, an improvement from an already high level five years ago and well above the European average of 12. Upper secondary schools in Sweden are by far the best equipped with 29 computers per 100 pupils.

Schools have moved over to broadband. 89% (EU25: 45%) of the schools in Sweden are connected to the internet via a broadband connection (which includes DSL connections) in 2006. The figure on DSL connections for 2001 was just 18% (EU15: 5%). The figures have increased strongly over the past 5 years.

Schools have already made heavy use of ICT in 2001. 71% (EU15: 44%) of the schools in Sweden had their own website in 2001; today that figure is 81% (EU25: 62%). The use of a LAN has remained at a very high level in Swedish schools and is now at around 70% (EU25: 54%).

Attitudes on the Usefulness of ICT use in Teaching

Computers and the internet arrived in Swedish schools some time ago.

The share of teachers in Sweden – but also in the European Union in general – who believe that computers and the internet should not at all be used in schools is extremely low and below 1%.

Swedish teachers have positive attitudes about the different applications of ICT in teaching and achieve high figures (above the European average) on attitudes that ICT should be used for letting pupils do exercises and practise (90%), letting pupils retrieve information in a self-directed manner (81%) and for collaborative and productive work by pupils (79%). There are only minor differences across school types.

A majority of Swedish teachers (73%) still believes that teaching about office tools should be an integral part of the teaching process. With this figure, the country ranks above the EU25 average figure. This attitude is prominent among teachers in all school types.

Attitudes on the Usefulness of ICT use in Teaching in Sweden 2006

Percentage of teachers saying computers/internet should be used for …	Total SE	Total EU25	Educational Level				Type of locality		
			Primary	Lower secondary	Upper secondary	Vocational	Densely populated	Inter-mediate	Thinly populated
Letting pupils do exercises and practise	90.0	79.9	89.4	91.2	94.5	89.0	90.2	96.7	88.6
Letting pupils retrieve information in a self-directed manner	81.3	85.0	78.3	80.3	92.8	92.0	84.1	76.8	81.4
Teaching about office tools	72.5	61.3	72.1	74.3	82.6	73.4	72.6	81.1	70.8
Collaborative and productive work by pupils	78.5	80.5	78.6	84.8	85.5	79.2	83.7	67.8	79.2
Computer/internet should not be used for any of these in teaching	0.5	0.6	0.0	0.8	0.7	1.6	0.7	0.0	0.5

Source: *LearnInd CTS 2006;* ***Base:*** *all teachers;* ***Question:*** *Q13: "What do you think for what computers and the internet should be used for in teaching?"*

Access, Competence and Motivation for Using ICT and the Internet in Schools

Access

A large majority of Swedish teachers are satisfied with the technical access means at their schools: 76% state that their school is well equipped with computers and 88% express the opinion that their internet connection is fast enough. However, 64% wish there were better support and maintenance actions taken.

In terms of content a majority states problems with respect to finding adequate learning materials (62%) and argue that existing materials are of poor quality (54%). In no other European country such high figures are reached. Further research is needed to identify the underlying reasons for this phenomenon.

Competence in using ICT

Swedish teachers feel most competent in using e-mail and using a text processor programme at levels well above the European average but are less confident with downloading and installing software and with using presentation software packages.

However, and what is striking, is the fact that almost three quarters of the teachers argue that the teachers in school have insufficient ICT skills. This comes as a surprise since with this very high figure on "lack of ICT competence" Sweden finds itself at the tail end in Europe. One can probably only assume that Swedish teachers seem to be very critical of their colleagues and themselves in this respect and downplay their ICT skills and capabilities. Again, further research may help to shed some light on this issue.

Primary school teachers (76%) seem to be less ICT competent than those in upper secondary (62%) and vocational schools (70%).

Motivation for ICT use in Schools

86% of Swedish teachers see significant learning benefits for pupils using computers in class and say that pupils are more motivated and attentive when computers and the internet are used in class.

However, almost 50% argue that using computers in class does not have significant learning benefits for pupils, a statement made particularly by teachers in primary schools.

The question remains as to what has driven the Swedish teachers to this statement – what they really believe, or whether they are more critical than their colleagues in other countries.

Teachers' access, competence and motivation for using ICT in class 2006

Percentage of teachers agreeing or strongly agreeing:	Total SE	Total EU25	Educational Level				Subject of teaching					
			Primary	Lower secondary	Upper secondary	Vocational	General primary	Literature and languages	Humanities and social sciences	Science, maths, computer sciences	Physical, artistic, crafts education	Vocational education
Access												
Our school is well equipped with computers [a]	75.8	74.2	74.2	73.4	91.6	90.5	75.6	75.3	68.0	75.8	*89.6**	*95.5**
The internet connection we have is sufficiently fast [b]	88.2	77.2	87.7	91.0	96.0	92.7	83.5	85.2	96.4	87.9	*99.5**	*88.6**
Better technical maintenance and support is required in our school [c]	63.5	64.8	66.1	65.9	49.7	30.5	65.2	60.9	62.6	62.8	*75.3**	*33.9**
Existing teaching materials on the Internet are of poor quality [d]	54.0	29.9	54.4	60.5	45.1	*40.6**	51.4	58.4	40.1	55.1	*69.3**	*57.9**
It is hard to find adequate learning materials for teaching [e]	61.9	38.7	62.9	71.3	54.9	*35.3**	55.1	63.9	58.3	58.4	*74.5**	*58.6**
Motivation												
Pupils are more motivated and attentive when computers and the internet are used in class [f]	86.3	86.3	85.8	86.6	85.9	67.3	89.1	84.2	88.9	85.0	*90.8**	*69.3**
Using computers in class does not have significant learning benefits for pupils [g]	48.4	20.7	52.1	44.4	37.0	36.5	56.4	45.7	42.0	53.4	*49.4**	*51.4**
Competence												
Teachers in our school do not have sufficient computer skills [h]	73.6	42.0	75.7	76.7	62.0	70.3	64.8	73.5	84.3	72.1	*97.5**	*76.0**
Competence / computer skills (Percentage of teachers who feel very confident at…)												
Using text processors [i]	72.5	65.0	72.6	72.2	85.4	*78.4**	67.4	72.5	83.4	75.4	*52.4**	*67.9**
Creating electronic presentations [j]	31.0	34.0	25.4	33.4	56.0	*58.4**	17.9	25.5	38.3	37.6	*25.9**	*62.3**
Using e-mail [k]	84.7	65.9	82.9	86.8	95.1	*90.2**	80.7	84.1	85.6	84.7	*80.5**	*92.6**
Downloading and installing software [l]	36.4	35.8	31.9	39.4	51.7	*52.1**	21.2	29.7	40.9	46.3	*43.1**	*61.0**

Source: *LearnInd CTS 2006;* ***Base:*** *a-h All teachers; i -l Teachers using computers in class* ***Question:*** *a-h Q14, i-l Q11.* ***Notes:*** *"xx.x*": based on at least 10 and less than 50 cases.*

ICT Readiness of Teachers – the ACM Model

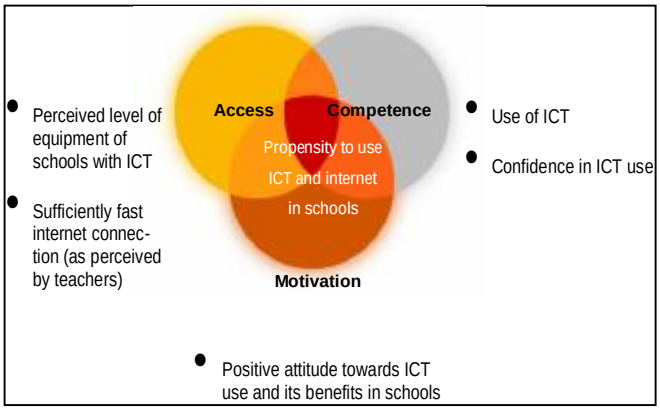
The ACM model as developed by Viherä and Nurmela (2001)[4] was applied in LearnInd to generate a typology according to the "propensity to the use of computers and internet by teachers in classroom situations at schools".

The typology in the figure below takes account of the three main categories of preconditions which need to be given for a school to make use of computers and the internet in the teaching process in classrooms, computer labs etc.

These are: access (to computers and the internet at school), competence (in using the computer software and the internet, and applying it for teaching purposes), and motivation (gauged through the attitude that using computers in classrooms results in significant learning benefits).

Any attempt to group the classroom teachers according to their propensity to becoming users of computers and the internet in their teaching processes needs to take account of these three dimensions. In the present application of the ACM model data from the Classroom Teacher Survey (CTS) was used. Therefore "access" for instance is to be understood as a perceived level of computer equipment at schools and teachers' satisfaction therewith rather than an objective measure of equipment status.

The Access-Competence-Motivation Model



38% of European teachers dispose of sufficient access to the internet at school, the necessary competence in using ICT in class and are motivated to its use.

With only 28% of the teachers belonging to this group, Sweden only ranks 22nd which places the country close to the bottom of European countries. Overall the UK with 60% ranks top and Latvia with 15% finds itself at the very end.

This is a surprising result and contradicts facts concerning ICT equipment in and internet access of schools, ICT skills etc. of Swedish teachers, which are obviously given at substantial levels. It requires further research to better understand the underlying reasons for this. It seems not unlikely that the Swedish teachers heavily underestimate their potential and are much more critical of themselves than teachers in other countries.

Access, Motivation and Competence of Teachers for Using ICT in Schools in Sweden 2006

SE	EU25	Access	Competence	Motivation
2.7	4.3	~~Access~~	~~Competence~~	~~Motivation~~
2.0	3.9	**Access**	~~Competence~~	~~Motivation~~
17.9	9.7	~~Access~~	**Competence**	~~Motivation~~
0	5.0	~~Access~~	~~Competence~~	**Motivation**
36.0	13.7	**Access**	**Competence**	~~Motivation~~
1.9	4.8	**Access**	~~Competence~~	**Motivation**
11.5	20.7	~~Access~~	**Competence**	**Motivation**
28.0	37.9	**Access**	**Competence**	**Motivation**
100	100			

Percentage of teachers. ***Source:*** *LeanInd CTS 2006;* ***Base:*** *All teachers;* ***Question:*** *See endnote* [5]

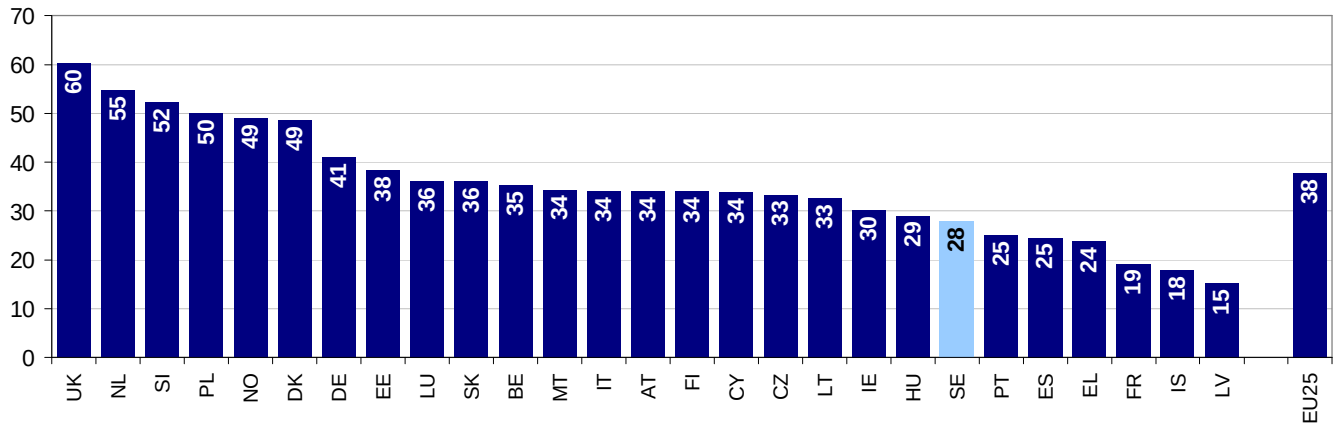
The as yet insufficient internet connection in many schools and a lack of motivation of teachers for using ICT are the most critical issues for a wider uptake of computers and the internet in schools in Europe. 20% of European teachers indicate insufficient computer equipment and the low speed of internet connection at their school as key barriers. 14% show a lack of motivation, i.e., they are of the opinion that using computers in class does not result in significant learning benefits.

The situation in Sweden is different. ICT access is not an issue but "motivation" is. A very high 36% – which is almost three times higher than the EU25 average – seem to lack motivation to use ICT despite their ICT access and competence to use it.

As a result of these surprising results which require further research, Sweden ranks among the bottom third of European countries on ICT readiness.

Despite the need for further research, it appears that actions addressed at an improvement of teacher's motivation for using ICT in class may prove useful and beneficial.

ICT Readiness of Teachers in Sweden: Percentage of Teachers Fully Ready to use Computers in Class (ACM Indicator) 2006



Source: *LeanInd CTS 2006;* ***Base:*** *All teachers.* ***Question:*** *See endnote 5*

ANNEXES

Methodology Report

Universe / Sample population

In order to assure the comparability of school levels in all countries UIS-OECD-EUROSTAT "Mapping of national education programmes to ISCED 97 for school academic/year 2002/2003" [6] was used for composing the sample frame. Based on this, each country divided its school system into ICSED codes and made different combinations that existed in its country.

Sampling frame and method

The sample was composed using official databases, which contained contact data of schools. In the majority of countries the sample was drawn from a database received from the Ministry of Education.

For each country a separate template of sample frames was composed by TNS Emor. These templates contained data about school types across regions as well as location type. School types were defined based on the ISCED codes provided in UIS-OECD-EUROSTAT. Location type distribution was made according to the Eurostat type of locality classification which differentiates densely populated, intermediate and thinly populated municipalities[7]. Apart from that, each country was divided into 3-7 regions depending on the size of a country.

Based on the data provided by countries, TNS Emor composed quotas for each country. Two level stratification was used – quotas for first stage, random sample for second. The quotation for region by school type and location type was endorsed. Simple random selection was conducted by the local agency or the local source of the contact base. Both private and public schools were included in the sample. It was also obligatory to include schools of other teaching languages than the official language of a country in the sample.

Simple random sampling was used inside a quota cell. This means that if the quota for primary schools in region1 was 100 and the total number of primary school in this region was 800, then a random sample selection was be made among those 800 schools. This covered also both private and public schools and schools of other teaching languages than the official language of a country.

No more than 50% of interviews could be made in one school level. At least 10% of respondents had to be from schools, which provided professional/vocational or combined programme of vocational and upper secondary level education (in case a country did not have special quota for those schools). It did not matter whether vocational education level was coded as ISCED 3 or ISCED 4.

There were no duplications in samples of head teacher and classroom teacher surveys. This was only allowed in countries with small universe sizes (e.g. Malta, Cyprus, Iceland, Estonia, Latvia etc) and in cases where the last quota cells were very difficult to achieve or there were not enough schools of a certain type. The priority was to include as many different schools as possible. In both surveys, 5 attempts were made before giving up and only if the respondent refused, was this person not contacted again.

The CATI programme generated a randomly chosen letter. The interviewer asked for the person with a surname that started on the generated letter. If there was more than one teacher whose surname started with the selected letter, the person who was first alphabetically was chosen. If the correct person was not available, an appointment was made. At least 5 attempts were made before taking another teacher.

Only in Malta, due to instructions dictated by the Education Department, would the Head Teacher randomly select a teacher who would be available for an appointment during which they would be interviewed.

Number of interviews conducted (HTS / CTS)

Country		Head Teachers	Classroom teachers
BE	Belgium	450	807
CZ	Czech Republic	500	1000
DK	Denmark	315	848
DE	Germany	450	901
EE	Estonia	400	851
EL	Greece	500	1000
ES	Spain	518	1022
FR	France	501	869
IE	Ireland	403	626
IT	Italy	500	900
CY	Cyprus	150	600
LV	Latvia	451	902
LT	Lithuania	457	908
LU	Luxemburg	82	277
HU	Hungary	500	1000
MT	Malta	100	200
NL	Netherlands	515	890
AT	Austria	320	450
PL	Poland	500	1000
PT	Portugal	450	900
SI	Slovenia	253	460
SK	Slovakia	502	1000
FI	Finland	318	601
SE	Sweden	200	450
UK	United Kingdom	450	905
IS	Iceland	177	424
NO	Norway	494	708
TOTAL		**10456**	**20499**

Fieldwork

Fieldwork was coordinated by the TNS Emor and conducted in cooperation with its local TNS offices excluding Iceland, Cyprus, Austria, Slovenia and Malta where TNS does not have offices. In these countries partners with whom TNS had previous experience were used.

Pilot interviews prior to the regular fieldwork were conducted with 20 schools in both target groups in Estonia and Greece in February 2006, in order to test the questionnaire (structure, comprehensibility of questions).

Between March and April 2006, surveys among head teachers (head teacher survey - HTS) and classroom teachers (CTS) were carried out in 27 European countries. TNS Emor was responsible for the fieldwork.

Weighting schemes

After the fieldwork, weighting coefficients were computed using region, location type and school type.

Statistical accuracy of the survey: confidence intervals

Statistics vary in their accuracy, depending on the kind of data and sources. A "confidence interval" is a measure that helps to assess the accuracy that can be expected from data. The confidence interval is the estimated range of values on a certain level of probability of error. Confidence intervals for estimates of a population fraction (percentages) depend on the sample size, the probability of error, and the survey result (value of the percentage) itself. Further to this, variance of the weighting factors has negative effects on confidence intervals.

The calculation of confidence intervals is based on the assumption of (quasi-) infinite population universes. In practice, however, in some countries and for some school levels the complete population of schools consists of only several hundred or even a few dozen of schools. In some cases, literally each and every school within a country-school type cell was contacted and asked to participate in the survey. This means that it is practically impossible to achieve a higher confidence interval through representative school surveys in which participation is not obligatory.

Country Background Data

Sweden has the highest life expectancy in Europe, the lowest infant mortality rate, and an above average birth rate. More money than in most other countries is invested in the educational sector.

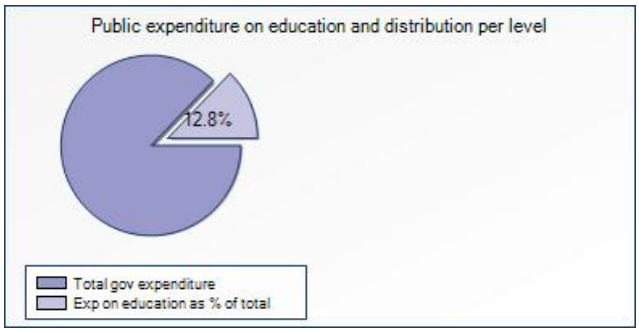
General Population Data for Sweden 2002/03[8]

Total population (000)	8,867
Annual population growth rate (%)*	0.3
Population 0-14 years (%)	18
Rural population (%)*	17
Total fertility rate (births per woman) *	1.6
Infant mortality rate (0/00) *	3
Life expectancy at birth (years) *	80
GDP per capita (PPP) US$ *	26,019
GDP growth rate (%)*	2.1
* World Bank World Development Indicators	

Resources for Education in Sweden 2002/03

Pupil / teacher ratio (primary)	11
Public expenditure on education :	
as % of GDP	7.7
as % of total government expenditure	12.8
Distribution of public expenditure per level (%):	
pre-primary	…
primary	…
secondary	…
tertiary	…
unknown	…

Resources for Education in Sweden 2002/03



The Educational System in Sweden[9]

Almost half of the population in Sweden is involved in some form of organised education. In 2003 there were 1,046,441 young people of compulsory education age. Just over 30% of people aged 20-29 years are enrolled in education. The main language of instruction is Swedish. There are state schools for the Samic population in the north of Sweden, where the basic curriculum are taught in both Swedish and Samic.

In Sweden, all students attend publicly funded schools. However, 7.2 % of the pupils attend private institutions, so called independent schools (6.2 % in compulsory school and 10.3 % in upper secondary school). Independent compulsory and upper secondary schools are open to everyone, follow the same curricula and receive grants from the municipalities according to the same criteria as the municipality's own schools. There are a few private institutions within tertiary education, of which some receive state subsidies to meet operational costs.

Education in Sweden is directed by a system of management by objectives. The Government has the overall responsibility for education and sets the framework for education at all levels, but the municipalities are responsible for providing and operating schools at basic, secondary and adult education level. The universities and university colleges are responsible for providing and operating tertiary education. The national framework consists of laws and ordinances and – for schools – curricula, objectives and syllabi. In tertiary education there are no national curricula, but an appendix to the ordinance stipulates degrees in undergraduate tertiary education and their requirements. Some responsibilities, especially regarding monitoring and evaluation of the system, are delegated to government agencies.

The National Agency for Education is responsible for monitoring, evaluation, follow-up and supervision of pre-schools, schools and adult education. The Swedish National Agency for School Improvement supports schools within the nationally prioritised areas. The National Agency of Higher Education is responsible for monitoring, evaluation, follow-up and supervision and, among other things, the provision of information to students as well as international contacts in tertiary education.

The use of ICT in Education[10]

Between 1999-2002 the Government implemented a special ICT initiative for the schools sector (ITiS) that involved offering a skills development programme to teachers working in a team, and together with pupils. The programme included a state grant for infrastructural improvements, including Internet connections and e-mail access for all pupils and teachers.

The Study

There is a lack of information on the actual use of ICT for learning in schools and for supporting political action in potential future programmes. It is necessary to clarify matters such as the educational vision of heads of schools, the current impact of ICTs on teachers' practice, support and training and on other factors for success in e-learning.

The objective of the study is to obtain estimates for the eEurope 2005 indicator on e-learning "number of pupils per computer with Internet connection (broadband/non-broadband)" and relate it to other possible indicators of educational use of ICT in compulsory education (e-learning in schools). The study looks at how Information and Communication Technologies (ICT) are used in schools.

The study is a continuation of the earlier benchmarking exercise for eEurope 2002.

It involved two surveys. Firstly of head teachers to obtain information on the schools and then of teachers to focus on their use of ICTs in the teaching process

This exercise is part of the Information Society monitoring and benchmarking process for which the Commission in cooperation with the Council defined benchmarking indicators.

Country Briefs

This document has been prepared by **empirica** based on own desk research and the above mentioned primary data sources: Head Teacher Survey (HTS) 2006 and Classroom Teacher Survey (CTS) 2006 in the EU25 member states, Iceland and Norway.

Altogether 27 LearnInd Country Briefs are available in a common format, one for each member of the enlarged European Union, Norway and Iceland.

A final report has been developed. It includes approximately 100 exhibits, more than 250 data tables and a report about the key results.

You can access and download these documents in PDF format (for free) from http://ec.europa.eu/information_society/eeurope/i2010/benchmarking/index_en.htm.

More information

Check our results and achievements on: http://ec.europa.eu/information_society/eeurope/i2010/benchmarking/index_en.htm. If you wish to be provided with more details, or to receive news and updates, please contact us at: **learnind@empirica.com** or get in touch with us.

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1 Note that "in class" means during lessons while teaching and does not denote a particular location such as a classroom.

2 This section includes some comparisons of the Eurobarometer Flash 94/1001 and 95/102 results from 2001 with those from the LearnInd surveys from 2006. Please bear in mind that the figures are not directly comparable due to the use of slightly different approaches and methodologies.

3 Base (100%) = all teachers who have used a computer in class in the last 12 months.

4 Viherä, M-L, Nurmela, J (2001) "Communication Capability Is an Intrinsic Determinant for Information Age", in Futures, Volume 33, Issue 3-4:245-265.

5 Synthetic indicators: Access: Q14 (2) "Our school is well equipped with computers" and Q14 (3) "The internet connection we have is sufficiently fast ".

Competence: Q11 How confident do you feel... a) using a text processor, b) creating a presentation c) using e-mail, d) downloading and installing software. Threshold: Average of 2.5 or more on a 1-4 confidence scale

Motivation: Q14 (8); disagree with "Using computers in class does not result in significant learning benefits".

For full question wordings refer to questionnaire.

6 http://forum.europa.eu.int/Public/irc/dsis/edtcs/library?l=/public/unesco_collection/programmes_isced97&vm=detailed&sb=Title

7 Densely populated area refers to a set of closely related local units, each one of which having a density greater than 500 inhabitants per km2, and the total population of which being of at least 50 000 inhabitants; Intermediate area refers to a set of closely related local units that do not pertain to a densely populated area, each one of which having density greater than 100 inhabitants per km2, and where the total population is at least of 50 000 inhabitants or it refers to a set that is adjacent to a highly populated area. Thinly populated area (rural): refers to a set of closely related local units that are not part of a densely populated area, or of an intermediate area. (A set of local areas totalling less than 100 km², not reaching the required density, but entirely enclosed within a densely-populated or intermediate area, is to be considered to form part of that area. If it is enclosed within a densely-populated area and an intermediate area it is considered to form part of the intermediate area).

8 Source: http://www.uis.unesco.org/profiles/selectCountry_en.aspx (visited 28 March 2006)

9 Source: http://www.eurydice.org/Documents/struct2/frameset_EN.html (visited: 28 March 2006)

10 Source: http://europa.eu.int/comm/education/policies/2010/nationalreport_en.html (visited: 9 May 2006)